

REMARKS

Sir:

Claims 1-34 were pending in the above-identified application; of these, claims 1-30 are rejected, claim 31 objected to, and claims 32-34 allowed. Applicants, having amended the specification and claims, respectfully respect reconsideration.

In the Specification

The examiner requests applicants' cooperation in correcting minor errors in the specification (OA, page 2). Applicants carefully reviewed the specification, noting numerous obvious typographical errors. The foregoing corrections address those errors: no new matter is added.

Rejections Under 35 U.S.C. 103Claims 1, 3-13, 20, 21, 25, and 27

Claims 1, 3-13, 20, 21, 25, and 27 stand rejected under section 103(a) as unpatentable over Patent No. 6,173,105 to Aksyuk (the '105 patent). These rejections are traversed in view of the foregoing amendments and the following remarks.

Claim 1 recites a device that includes a first fiber with a first end facet and a second fiber with a second end facet. The two facets are separated by a gap and positioned so the second end facet receives light from the first. The specification depicts such an arrangement in Figure 2A, for example, which shows first and second fibers 111 and 112, respective first and second end facets 111A and 112A, and a beam of light 201 coming from facet 111A.

Claim 1 additionally recites:

a blade having a first blade surface
facing said first end facet and forming

a first angle with respect to said first end facet and a second blade surface facing said second end facet and forming a second angle with respect to the first blade surface...

The recited blade is again supported in Figure 2A, in which a blade 210 includes a first surface 210A facing end facet 111A and a second surface 210B facing end facet 112A. As in claim 1, the first surface 210A is disposed at an angle with respect to (i.e., is not parallel to) end facet 111A, and the second the blade surface 210B is shown to be at an angle 216 with respect to the first blade surface 210A.

The '105 patent to Aksyuk teaches a shutter 14 disposed in a gap 13 between first and second end facets. The shutter has first and second sides, each facing a respective end facet, and can be inserted "at such an angle into [the gap] that little reflected light is redirected into the core section of [a] source fiber" (column 3, lines 17-20). Unlike the device of claim 1, however, the sides of shutter 14 are parallel to one another, regardless of the angle of the shutter with respect to the facets. The '105 patent therefore fails to teach a blade that includes "a first blade surface facing said first end facet" and "a second blade surface facing said second end facet and forming a second angle with respect to the first blade surface..."

The '105 patent neither teaches nor suggests the use of a blade with first and second blade surfaces facing respective first and second fiber end facets, in which the first and second blade surfaces form an angle with respect to one another. Claim 1 is therefore allowable over the '105 patent, and the rejection of that claim should be withdrawn.

Claims 3-10, 12, 13, 20, and 21 depend from claim 1, and are therefore allowable over the '105 patent for at least the same reasons claim 1 is allowable.

Claim 9 additionally specifies that the second blade surface is "substantially parallel to said second end facet." Figure 2A depicts a supportive embodiment, in which the second blade surface 210B is substantially parallel to end facet 112A. In contrast, tilting the shutter 14 as suggested in the '105 patent would position both "blade" surfaces at angles with respect to the opposing fiber end facets. Claim 9 thus further distinguishes the '105 patent.

Claim 10, combined with parent claim 1, specifies three angles: a first angle between the first blade surface and the first end facet, a second angle between the first blade surface and a second blade surface, and a third angle between the second blade surface and the second end facet. Claim 10 is supported by the embodiment of Figure 2B, in which a blade 220 is formed to include blade surfaces 220A and 220B that, when inserted between the end facets of fibers 111 and 112, produce the three angles. Nothing in the '105 patent teaches or suggests such a blade configuration.

Claim 11 is cancelled, rendering the rejection of that claim moot.

Claim 25 recites a blade configuration similar to that of claim 1, and consequently distinguishes the '105 patent for similar reasons. Briefly, claim 25 recites a method that includes:

causing [a] blade to move in [the gap
between two fiber end facets] to
interfere with [a] direct optical
coupling by optical refraction or
reflection,

wherein said blade has a first blade surface facing the first of the end facets at a first angle with respect to an end facet of a fiber that outputs light to said blade surface, and

wherein said blade has a second blade surface facing a second of the end facets and forming a second angle with respect to the first blade surface.

(Claim 25, emphasis added.) The italicized phrase highlights language distinguishing claim 25 over the teachings of the '105 patent; namely, the first blade surface is at an angle with respect to the second blade surface. As noted above in connection with claim 1, the '105 patent does not teach or suggest this feature: the rejection of claim 25 should therefore be withdrawn.

Claim 27 depends on claim 25: the rejection of claim 27 should therefore be withdrawn for at least the reasons the rejection of claim 25 should be withdrawn.

Claims 2, 14, 16-19, 22, 26, and 28-30

Claims 2, 14, 16-19, 22, 26, and 28-30 stand rejected under 103(a) as unpatentable over the '105 patent in view of Patent No. 6,246,826 to O'Keefe (the '826 patent).

Claims 2, 14, 16-19, and 22 depend from claim 1, and consequently include a blade configuration in which a first blade surface facing a first end facet is formed at an angle with respect to a second blade surface facing a second end facet. Claim 1 distinguishes the '105 and '826 patents, either separately or together, because neither of those references teaches nor suggests such a blade configuration. Claims 2, 14, 16-19, and 22 depend from claim 1, and consequently distinguish the '105 and '826

patents for the same reasons. The rejections of claims 2, 14, 16-19, and 22 should therefore be withdrawn.

Claim 19 recites the device of claim 1, in which a feedback circuit "controls said actuator to a bias position at which movement of said actuator is approximately linear with respect to a change in a control to said actuator." The examiner finds support for this language in the '826 Patent, which teaches:

[B]y patterning the required profile of the blade, it is insured that the attenuation is a pre-determined function of the blade. For most applications, it provides a big advantage, especially where a substantially linear response of the device is required.

('826, column 3, lines 8-15.)

The '826 patent teaches a blade that is profiled to produce a more linear response as it cuts a beam of light. The linear response referred to by the examiner is thus the response of the optical attenuation of a light beam, and not the displacement of the blade with respect to a control signal. In contrast, applicants teach a control mechanism that linearizes the position of the attenuating blade with respect to the control signal. This aspect of applicants' invention is detailed in connection with applicants' Figure 10.

The '826 Patent teaches that the optical output should be linearized with respect to actuator movement, and not that the actuator movement should be linearized with respect to a control signal. Nor does the '826 patent teach or suggest selecting an actuator bias position at which the movement of the actuator is linear with respect to a change in a control signal, as is recited in claim 19. The rejection of claim 19 should therefore be withdrawn.

Claim 22 further recites a "bias signal" that sets the actuator to a biased position at which movement of the actuator "is damped with respect to a change in said control signal in said actuator." The examiner rejected claim 22 as obvious in light the '826 patent's teaching at column 4, lines 34-36, of damping a blade by filling the package with oil. Applicants respectfully submit that a teaching to submerge the blade in oil to provide damping neither anticipates nor renders obvious a "bias signal." The rejection of claim 22 should be withdrawn for at least this additional reason.

Claim 26 recites a blade disposed between end facets of a pair of fibers and engaged to a rotational actuator that moves the blade in response to a potential difference. Claim 26 additionally recites the step of:

causing a bias in [a] potential difference to make said rotational actuator respond approximately linearly and with damping with respect to a change in said potential difference.

Similar limitations are discussed above in connection with claims 19 and 22, and claim 26 distinguishes the cited references for similar reasons. In essence, nothing in the '105 or '826 patents teaches or suggests a manner of "causing a bias" to make a rotational actuator respond approximately linearly and with damping. The rejection of claim 26 should therefore be withdrawn.

Claim 28 recites a device that includes, among other things, a blade disposed between a pair of end facets of respective optical fiber, the blade having first and second blade surfaces facing respecting end facets "and forming a second angle with respect to" one another. As noted above,

neither of the '105 or '826 patents teaches such a blade. The rejection of claim 28 should therefore be withdrawn.

Claims 29 and 30 depend from claim 28, so the rejections of claims 29 and 30 should be withdrawn for at least the same reasons the rejection of claim 28 should be withdrawn.

Claim 15

Claim 15 stands rejected under 103(a) as unpatentable over the '105 and '826 patents in view of application no. 2002/0172452 A1 to Zhang (the '452 reference). Claim 15 depends from claim 1, and consequently includes a blade configuration in which a first blade surface facing a first end facet is formed at an angle with respect to a second blade surface facing a second end facet. Claim 1, and therefore claim 15, distinguishes the '105 and '826 patents and the '452 reference, either separately or together, because those references neither teach nor suggest such a blade configuration.

Claims 23 and 24

Claim 23 and 24 stand rejected under 103(a) as unpatentable over the '105 patent to Aksyuk and patent no. 6,075,239, also to Aksyuk (the '239 patent). Claims 23 and 24 both depend on claim 1, and consequently include the blade configuration, discussed above, in which a first blade surface facing a first end facet is formed at an angle with respect to a second blade surface facing a second end facet. Claim 1, and therefore claims 23 and 24, distinguishes the '105 and '239 patents, either separately or together, because neither of those references teaches nor suggests such a blade configuration.

Claim Objection

Claim 31 is objected to as being dependent on rejected base claim 28. The foregoing amendments to claim 28 and the associated arguments overcome the rejection of that base claim, so claim 31 is believed to be in a condition for allowance.

Allowed Claims

Claims 32-34 are allowed.

New Claims

Applicants added new claims 35-60, each of which is supported by the specification and allowable over the cited references for at least the following reasons.

Claims 35-41

Claim 35 recites a variable optical attenuator that includes a blade extending through a gap between a first facet launching an optical beam and a second facet receiving the optical beam. The blade includes first and second blade surfaces, each facing a respective one of the first and second facets, "wherein the first and second blade surfaces are nonparallel." As discussed above (in connection with claim 1, for example) the cited references neither teach nor suggest a blade having the recited nonparallel blade surfaces.

Claims 36-41 depend from claim 35, and therefore distinguish the cited references for at least the same reasons claim 35 distinguishes.

Claims 42-49

Claim 42 recites an attenuator that includes a blade extending through a gap between a first facet launching a beam and a second facet receiving the beam. The blade intersects a portion of the beam and attenuates "the portion of the beam by refraction." In contrast, the blades or shutters of the cited references attenuate light by reflecting or scattering an optical beam, not by refraction. In the absence of such teaching or suggestion, claim 42 should be allowed.

Claims 43-49 depend from claim 42, and should therefore be allowed for at least the same reasons claim 42 should be allowed.

Claims 50-53

Claim 50 recites an attenuator that includes a blade extending through a gap between a first facet launching a beam and a second facet positioned to receive the beam. An actuator connected to the blade adjusts the blade within the gap at the direction of some control circuitry that "electrically biases [control signals to the actuator] to place the ... actuator in a linear response range when intersecting the portion of the optical beam."

With respect to similar language in claim 19, the examiner finds support for linearizing actuator response in the '826 patent, which teaches:

by patterning the required profile of the blade, it is insured that the attenuation is a pre-determined function of the blade. For most applications, it provides a big advantage, especially where a substantially linear response of the device is required.

('826, column 3, lines 8-15). The linear response referred to by the examiner is the response of the optical attenuation of a light beam, and not the displacement of the blade with respect to a control signal. The '826 patent does not teach a method of linearizing the physical response of a blade to control signals, as recited in claim 50. In the absence of such teaching, claim 50 should be allowed.

Claims 51-53 depend on claim 50, and are therefore allowable for at least the same reasons claim 50 is allowable.

Claims 54-60

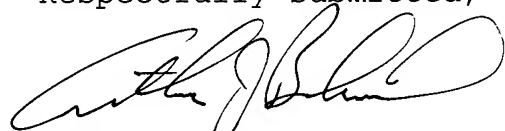
Claim 54 recites an attenuator that includes a substrate connected to a first facet "launching a beam in a first direction substantially parallel to the substrate" and a second facet "separated from the first facet by a gap and positioned to receive the beam." A blade extending through the gap intersects "a portion of the beam," and includes a "first blade surface reflecting some of the portion of the beam in a second direction substantially parallel to the substrate." Claim 54 is supported, for example, in Figure 1 and 2A, in which blade 210 is shaped to reflect a beam 202 in a direction substantially parallel to the substrate upon which fibers 111 and 112, and their associated facets, are mounted. In contrast, tilting shutter 14, as taught in the '105 patent to Aksyuk, reflects a portion of the beam either toward or away from - and not parallel to - Aksyuk's substrate 19. Further, the '105 patent does not suggest providing a blade surface that reflects light in a direction substantially parallel to the substrate. Claim 54 should therefore be allowed.

Claims 55-60 depend from claim 54, and should therefore be allowed for at least the same reasons claim 54 should be allowed.

CONCLUSION

For the reasons presented above, the pending claims are in condition for allowance; accordingly, applicants respectfully request a Notice of Allowance. If the examiner's next action is other than allowance of the pending claims, the examiner is requested to call applicants' representative at (925) 461-2616.

Respectfully submitted,



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I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on April 15, 2003.

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Name


Signature